moving, while each worker comes between the soldiers and deposits its load, returning until the breach is closed.

Besides the above-described forms, there are always a great number of immature termites all over the nest, from the tiny larvæ just hatched from the eggs to the pupæ with their wing-cases reaching down to the middle of the back.—*Agricultural Gazette of New South Wales*, May 1897, pp. 297–300.

Care of the Brood in Psolus antarcticus.

By Prof. Hubert Ludwig, of Bonn.

I am already once more able to report a hitherto unknown case of care of the brood in Holothurians, and again it is a question of an antarctic species and of a form of care of the brood which is new for Holothurians. Although since its first description by Philippi (1857) *Psolus antarcticus* has been on several occasions the subject of observation and study, for it has been investigated by Studer (1876), Théel (1886), Lampert (1889), and myself (1886), nothing whatever had been learnt of the existence of care of the brood in this species. It is true that we have been told by Wyville Thomson (1876) that another antarctic *Psolus*, Thomson's *P. ephippifer*, brings up its young beneath the dorsal plates modified for this purpose; but that the longest-known antarctic species of *Psolus—P. antarcticus* (Phil.)—the range of which extends from Payta (Peru) southwards as far as Cape Horn, also belongs to the forms which care for their brood is an unexpected discovery. The score of large and small specimens that Dr. Michaelsen has brought home from the Hamburg-Magellan Collecting Expedition * include ten small and medium-sized examples which were collected on July 9, 1893, in Smyth Channel (north-east of the Straits of Magellan); among these I met with two which to my surprise carried their young on the ventral side, which is flattened to form the creeping sole.

In the specimen which is the better preserved of the two and measures 12·5 millim. in length by 8·5 millim. in breadth I find almost one half of the creeping sole occupied by young animals (twenty-two in number), which are all in the same stage of development and are attached by their pedicels to the area of the sole which is bare or devoid of pedicels. The pedicels of the adult animal are not touched by the young; moreover, no young are to be found on the outside of the maternal pedicel-zone. While care of the brood is in progress the mother can move about as freely as ever or can attach itself and adhere firmly to its support. Contrary, therefore, to what

* It was in the material obtained by this expedition that I also discovered care of the brood in the case of *Chiridota contorta*, as recently reported by me ('Zool. Anzeiger,' Bd. xx. 1897, no. 534, pp. 217–219 [Ann. & Mag. Nat. Hist. ser. 6, vol. xx. 1897, pp. 327–328]).

[illegible] find in *Cucumaria crocea*, Less., where, moreover, the young are [illegible]e not on the ventral but on the dorsal surface, ambulacra do not [illegible]ave to assist in the care of the brood. The young are attached close together in a single layer to the median area of the creeping sole, which is hedged round by the pedicels; if they be detached, the spots they previously occupied are indicated only by slight impressions.

The young average but 1·5 millim. in length and barely 1 millim. in breadth, but are nevertheless already well developed, so that they represent a tiny copy of the adult animal. The arched dorsal surface already possesses a closed armature of imbricated calcareous plates, among which the five oral plates can clearly be distinguished. In their development these dorsal plates pass through a stage which is retained permanently by the calcareous bodies in the ventral integument of the adults. The flat ventral side is encompassed by a single (not yet double) series of twenty pedicels, which are already equipped with a relatively large terminal disk and some supporting plates. These pedicels develop later on into the inner series of larger pedicels which we find at the margin of the ventral surface of the adults, while as yet there have appeared no rudiments of the series of much smaller external pedicels. In the ventral integument the formation of the calcareous bodies has only just begun. In the calcareous ring there can already be recognized five radial and five interradial pieces, similar in form to those in the adults; towards the radialia there already extend distinct retractor muscles. Moreover the full complement of tentacles (ten) is already present, and they contain in their walls a few small cribriform plates. A calcified madreporic plate belonging to the stone-canal is developed. The intestine is coiled in the same way as it is subsequently. Of respiratory trees, however, no rudiments appear yet to have come into existence, nor can I yet observe any trace of the genital organs.

The number of Holothurians which care for their brood consequently now amounts to nine, including five antarctic and one arctic species. Not only is the relatively large number of the antarctic forms exceedingly striking, but almost even more remarkable is the circumstance that in each of the five antarctic species the care of the brood is effected in a different way. In *Psolus ephippifer* the young develop beneath the dorsal plates, in *Cucumaria crocea* upon the modified dorsal ambulacra, in *Psolus antarcticus* upon the ventral creeping sole, in *Cucumaria lævigata* in ventral brood-pouches, and, lastly, in the case of *Chiridota contorta* in the genital canals.—*Zoologischer Anzeiger*, Bd. xx. no. 535 (July 5, 1897), pp. 237–239.